DOCUMENT RESUME

ED 219 455 TM 820 484

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TITLE Direct and Frequent Measurement of Student Performance: Does it Take Too Much Time?
INSTITUTION Minnesota Univ., Minneapolis. Inst. for Research on Learning Disabilities.
SPONS AGENCY Office of Special Education and Rehabilitative Services (ED), Washington, DC.
REPORT NO IRLD-RR-67
PUB DATE Feb 82
CONTRACT 300-80-0622
NOTE 29p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Efficiency; *Evaluation Criteria; *Learning Disabilities; Mastery Tests; Measurement Techniques; *Performance Tests; *Special Education Teachers; Test Use; *Time Perspective
IDENTIFIERS *Curriculum Related Testing; *Repeated Testing; Time Utilization

ABSTRACT

The familiarity and use of direct and frequent measurement in special education was examined using three sample groups of teachers serving learning disabled students. Although most teachers were shown to be familiar with direct and frequent measurement strategies, relatively few were found to use them, in the belief that the repeated measures were too time consuming. Teachers ability to make time estimations and measurement efficiency are discussed. Teachers who did use the techniques most often reported that the procedures required less than ten percent of a student's instructional time. The implications in special education and teacher training are discussed. (Author/CM)

University of Minnesota

Research Report No. 67

DIRECT AND FREQUENT MEASUREMENT OF STUDENT PERFORMANCE : DOES IT TAKE TOO MUCH TIME?

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Institute for Research on Learning Disabilities

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The Institute for Research on Learning Disabilities is supported by a contract (300-80-0622) with the Office of Special Education, Department of Education, through Title VI-G of Public Law 91-230. Institute investigators are conducting research on the assessment/decision-making/intervention process as it relates to learning disabled students.

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February, 1982

Abstract

Three groups of teachers serving LD students provided information related to the use of direct and frequent measurement in special education. Although most teachers were familiar with direct and frequent measurement strategies, relatively few used them because of the belief that they were too time consuming. However, teachers who did use the techniques most often reported that such measurement requires less than 10% of a student's instructional time. The implications of these and other findings for measurement in special education and for teacher training are discussed.

Direct and Frequent Measurement of Student Performance:

Does it Take Too Much Time?

Public Law 94-142 and increased pressure for accountability in education have been the catalysts for generating interest in curriculum-based testing as a means of formulating and documenting decisions that affect handicapped students (Jenkins, Deno, & Mirkin, 1979; Lovitt, 1977; White & Haring, 1980). When psychometric properties are compared, direct and frequent measurement strategies based on the curriculum have considerable advantage over conventional, summative measurement tec niques, such as standardized achievement tests (Fuchs, 1981). Moreover, an increasing body of evidence suggests that direct and frequent measurement of school behaviors may be used to increase student motivation as well as to evaluate continuously students' instructional programs (Haring & Krug, 1975; Jenkins, Mayhall, Peschka, & Townsend, 1974; Mirkin, Deno, Tindal, & Kuehnle, 1979). Given these benefits of direct and frequent measurement of student performance, several issues concerning the use of these techniques surface.

Despite their numerous limitations, standardized tests commonly are used to make decisions about students in special education settings (Thurlow & Ysseldyke, 1979). While direct and frequent measurement strategies have many qualities that make them ideal for use in special education, the literature is devoid of information indicating the extent to which special educators are familiar with and use these techniques. Clearly, there is a need to document the extent to which these procedures are used as well as to estimate how many teachers have heard about direct

and frequent measurement.

One area of concern in regard to the use of direct and frequent measurement is the amount of time teachers require to conduct these measurements (i.e., efficiency of the measurement procedures). A teacher presented with the concept of direct and frequent measurement might react negatively to the idea by assuming that measuring any behavior three to five times each week would take away too much precious instructional time. Likewise, teachers who already are familiar with direct and frequent measurement may decide against its use due to the time required for measurement. For this reason, it is important to determine the percentage of time teachers require to measure performance using direct and frequent measurement, and whether teachers judge this time commitment to be excessive.

In addition to time considerations, teachers who are familiar with the concept of direct and frequent measurement might have other concerns that inhibit their use of these procedures. Identifying these concerns can lead to systematic efforts to solve these problems and further pave the way for increased use of direct and frequent measurement techniques.

The purpose of this investigation was to answer four questions regarding special education teachers' familiarity with and use of direct and frequent measurement of student behavior. Specifically, the questions were: (a) What percentage of LD teachers have heard of direct and frequent measurement? (b) What percentage of these teachers use direct and frequent measurement? (c) For those teachers who use

direct and frequent measurement, what percent of time do they allocate to the measurement of student behavior in the classroom? (d) For those teachers who do not use direct and frequent measurement, what factors inhibit their use of this type of measurement?

Efficiency of measurement was explored specifically as a potential hindrance to the use of direct and frequent measurement. The accuracy of teachers' estimates of the amount of time spent in measurement tasks was examined. If teachers tended to inaccurately estimate this time commitment, then perhaps information about the actual time required would lead to reconsideration of the use of direct and frequent measurement. Further, those teachers who use direct and frequent measurement were asked to indicate whether they felt the amount of time spent in measurement tasks should increase, decrease, or stay the same.

Method

Subjects

Three separate groups of teachers were surveyed in order to obtain a broad data base for the research questions.

Sample One. Subjects were 136 LD teachers who responded to a postcard survey sent to 300 randomly selected members of the Council for Exceptional Children (CEC) Division for Children with Learning Disabilities (DCLD), now called the Council for Learning Disabilities (CLD). The overall response rate for this sample was 45.3%. However, four of the surveys were filled out and returned by administrators, and thus were not included in the analysis. The subjects were from all regions of the U.S.

Sample Two. Subjects were 10 special education elementary resource teachers (2 male, 8 female) in a rural educational cooperative in

Minnesota who were required by their special education director to participate in a series of studies designed to examine teacher efficiency in employing repeated, curriculum-based measurement. A detailed description of this sample is provided by Fuchs, Wesson, Tindal, Mirkin, and Deno (1981).

Sample Three. Subjects were 128 LD teachers who responded to an in-depth survey (Mirkin & Potter, 1982) sent to a random selection of 373 DCLD members (return rate = 34.3%). This sample was generated at a different time from Sample One and is thus treated as a separate subject pool. Subjects in this sample were located in 42 states and were evenly distributed across rural, urban, and suburban school districts.

Data Collection

For Sample One, a postcard survey was developed to assess LD teachers' familiarity with and use of direct and frequent measurements, as well as factors that might inhibit their use of such measurements. Specifically, respondents were asked to indicate whether they had heard of direct and frequent measurement. Second, they were asked to indicate whether they used direct and frequent measurement. Those who responded in the affirmative were asked to indicate the percentage of teaching time they allocated to measurement of student behavior. Those respondents who indicated that they did not use direct and frequent measurement in the classroom were asked to list specific factors that inhibited their use of these measurement techniques. All subjects were asked to indicate the number of students taught daily, the age ranges of the students, and the type of classroom in which they taught (see Appendix A).

Subjects in Sample Two, who had been trained in direct and frequent

measurement, were asked to estimate the amount of time they spent conducting measurement with a student. These teachers then monitored their measurement time; therefore, a direct comparison of estimated and actual time spent in measurement was possible.

Sample Three subjects were asked to respond to an in-depth Program Planning and Implementation Survey based on a structured interview (Mirkin & Potter, 1982). This survey included eight major sections of inquiry. Data reported in the present study were taken from the "Evaluation of Progress" section in which respondents indicated the type of evaluation information they collect in several academic areas in which they provide instruction. Further, respondents were asked to estimate the percentage of time they spent in progress evaluation activities as well as to indicate whether they thought the time currently allocated to measurement should increase, decrease, or stay the same.

Procedure

In April 1981, 300 postcard surveys along with a cover letter were sent to DCLD members (Sample One). The cover letter asked the recipients of the survey to forward the survey/letter to an LD teacher if they were not themselves LD teachers. No attempt was made to contact subjects who did not respond to the survey.

Subjects in Sample Two were asked to estimate their time spent in measurement tasks. These estimates were compared to actual measurement data they recorded as part of a study on efficiency.

Surveys mailed to the Sample Three subjects were sent in April and May, 1981. This mailing, although similar to that for Sample One, also

included a follow-up reminder and an incentive of a free monograph or research report of their choice, as well as a copy of the results of the study.

Results

Background Information

Sample One subjects provided information about the number of students they were teaching, the number they taught daily, the age range of the students, and the type of classroom in which they taught (see Table 1). The mean number of students taught overall was 22.58, and the mean number of students taught on a daily basis was 20.21. The mean ages for the students ranged from a low of 9.02 to a high of 14.06. The type of classroom most frequently cited by teachers was Resource Room (58.9%), followed by Self-contained (26.4%), and Other (14.7%).

Insert Table 1 about here

Background information for Sample Two (Fuchs et al., 1981) and Sample Three (Mirkin & Potter, 1982) is described in detail in these separate reports, and thus is not reported here.

Familiarity With, and Use of, Direct Measurement

When asked to indicate whether they had heard of direct and frequent measurement, Sample One subjects overwhelmingly responded in the affirmative (82.1%). Of those 110 respondents who had heard of direct and frequent measurement, 53.6 responded that they used frequent measurement in the classroom, while 46.4 responded that they did not. Of the total number of respondents (N = 136), 43.8 used this approach to evaluate

student performance. These percentages are somewhat higher than those obtained from Sample Three, where only 33.6 indicated that they used direct and frequent measurement techniques.

Estimated Measurement Time

Of those respondents in Sample One who used direct and frequent measurement in the classroom, 57 estimated the amount of time devoted to measurement. The majority (27) of these teachers spent up to 10% of the time taking measurements (47.4%), while another 14 (24.6%) spent 11-20% of the time devoted to measurement. These two categories accounted for 72 of the teachers who used direct and frequent measurement in the classroom. The responses of the remaining teachers were distributed nearly evenly among the remaining time categories (see Table 2).

Insert Table 2 about here

Half of the Sample Two subjects estimated that less than 10% of the time spent with a student was measurement time. Four teachers estimated measurement time to be 11 to 20% of a student's time; only one teacher estimated that measurement activities took from 21% to 30% of a student's time.

When respondents from Sample Three who used direct and frequent measurement (N = 43) were asked to estimate the amount of time they spent in measurement of progress, their responses differed greatly from those provided by Sample One subjects (see Table 3). Two respondents estimated they spent 10 of time or less in measurement activities (4.6%). This contrasts with the finding that 47.4% of the respondents in Sample One estimated their time as 10% or less. The most frequently cited time

category for Sample Three respondents was the 11-20% category, which was selected by 16 of the respondents (37.2%); an additional 11 respondents (25.6%) selected the 21-30% category.

Insert Table 3 about here

Comparing Estimated and Actual Measurement Time

The 10 teachers in Sample Two estimated measurement time and monitored measurement time on a total of 17 students. These teachers accurately estimated measurement time for six students (35.3%), and underestimated measurement time for five students (29.4%).

Teachers' Opinions on Changing Measurement Time

Respondents from Sample Three were asked to indicate whether, under ideal circumstances, they would like to see the percentage of time allocated to measurement increase, decrease, or stay the same. The majority of respondents (58.1%) preferred to keep the percentage of time allocated to measurement the same while 13 respondents (30.2%) preferred to increase the amount of time allocated to measurement tasks. Only 5 of the 43 respondents (7) preferred to decrease the amount of time spent in measurement or progress (see Table 3).

Factors Inhibiting Use of Direct and Frequent Measurement

Seventy of the Sample One teachers who did not use direct and frequent measurement indicated factors that inhibited their use of this type of measurement (see Table 2). The factor mentioned most often ( ) was that direct and frequent measurement is too time consuming. The second most frequently recorded response (22.8%) was that they did not know how to use direct and frequent measurement; only 10 (14.3%)

of the subjects felt that such measurement was not useful. The remaining 14 responses (20.0 %) gave "other" reasons that varied greatly (see Appendix B).

Discussion

Results reported here clearly indicate that most special education teachers have heard of direct and frequent measurement teachniques. Thus, it seems that information regarding direct and frequent measurement has been widely disseminated, at least to special education teachers.

Usage of these techniques is the next issue. In the first sample, many of the teachers who had heard of direct and frequent measurement did not use these techniques. Slightly over half of the respondents who had heard of direct and frequent measurement techniques employed them. Interpretation of this result must be tempered by the fact that the sampled population consisted of teachers who were actively involved in their professional organization. The percentage using direct and frequent measurement reported in Sample Three was even lower. Thus, although direct and frequent measurement has received nationwide attention, the use of the measurement techniques appears to be limited.

Given the benefits of direct and frequent measurement and its widespread dissemination, the question of why these techniques are not more widely used becomes of central importance. The results of the postcard survey indicated that two primary factors have inhibited the use of direct and frequent measurement. One frequently cited reason for not employing these techniques was that many teachers do not know how. Apparently, many teachers are aware of the concept of direct and frequent measurement but have not received training in these techniques. However,

the largest group of respondents who choose not to measure students' behavior directly felt that direct and frequent measurement is too time consuming. Thus, the issue of efficiency in measurement becomes paramount.

How much time does it take to use direct and frequent measurement techniques? According to the postcard survey, the majority of teachers who use direct and frequent measurement estimated that they spent less than 10% of their time with a student in measurement activities. Approximately one-quarter of these respondents estimated that 11% to 20% of the student's time was devoted to measurement. Another quarter of the respondents estimated that measurement activities consumed more than 20% of the time they spent with students. However, teachers' ability to estimate time spent in measurement accurately is called into question as comparison data obtained from Sample Two indicates.

Given the problems with estimating measurement time, the issue of efficiency in measurement can be addressed more accurately through direct observation of the measurement behavior. As was mentioned previously, the 10 Sample Two resource teachers directly monitored their measurement times. This group of teachers also was given prompts and training in modifications of their measurement behaviors to help increase their efficiency. These attempts to increase efficiency were successful; the median time required to prepare for, direct, score, and graph one measurement task was reduced from over five minutes per task on the first trial to one minute per task at the year's end (Fuchs et al., 1981). In a related study (Wesson, Mirkin, & Deno, 1982), a second group of teachers also was trained to monitor their own measurement time. This

group of six suburban teachers did not receive prompts to increase their efficiency and, unlike the rural teachers, employed the measurement procedures with only one student rather than their entire caseload. These teachers required 15 minutes per task for preparation, directions, and scoring and graphing. Thus, it appears that procedures for increasing teacher efficiency in measurement must be used if teachers are to successfully reduce the time spent in measurement.

To summarize, most teachers who choose not to employ direct and frequent measurement techniques make this decision based on the assumption that these techniques are too time consuming. However, the present results reveal that even those teachers who use these techniques are inaccurate in their estimates of how much time is involved. Therefore, it seems likely that teachers who do not use direct and frequent measurement are inaccurate about the amount of time required. Also, when efficiency in measurement is stressed, teachers can find ways to reduce the amount of time spent in measurement substantially. In fact, trained and experienced teachers require only two minutes to prepare for, administer, score and graph student performance. In addition, since related research reveals that frequent measurement improves achievement (Bohannon, 1975; Mirkin et al., 1979) the proposition that direct and frequent measurement is a waste of critical instructional time is without basis in fact.

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Table 1

Frequency and Percentages of Number of Students Taught,

Age Ranges of Students and Type of Classroom

Number of Students Teach = 22.58

Number of Students Teach Daily = 20.214

Mean Age Range of Students - Minimum = 9.02

Maximum = 14.065

Type of Classroom:	N	Adjusted Frequency (Percent)
Resource Room	76	58.9%
Self-Contained	34	26.4%
Other	19	14.7%
Blank	7	---
Total	136	100%

Table 2

Frequency and Percentages of Postcard Survey Questions Pertaining to Familiarity and Usage of Direct and Frequent Measurements

1. Have you heard of direct and frequent (precision-teaching type) measurement of student behavior?

	N	Adjusted Frequency (Percent)
Yes	110	82.1
No	24	17.9
Blank	2	---
Total	136	100%

2. Do you use direct and frequent measurement in your classroom?[a] If yes, answer question 3. If no, answer question 4.

Yes	59	53.6
No	51	46.4
Total	110	100%

3. When you are teaching a student and using direct and frequent measurement what percentage of that time is devoted to measurement?[b]

1. Up to 10%	27	47.4
2. 11-20%	14	24.6
3. 21-30%	4	7.0
4. 31-45%	5	8.8
5. 46-60%	4	7.0
6. 61-75%	3	5.3
7. 75% and up	-	-
Blank	2	-
Total	57	100%

4. What factors have inhibited your use of direct and frequent measurement?[c] (Check one or more.)

Too time consuming	30	42.8
Not useful	10	14.3
Don't know how	16	22.8
Other (please specify)	14	20.0
Total	70	100%

[a]Analysis is based on 110 respondents who were familiar with direct and frequent measurement (see question 1).

[b]Analysis is based on 59 respondents who indicated they use direct and frequent measurement in the classroom (see question 2).

[c]Analysis is based on 51 respondents who indicated they did not use direct and frequent measurement (see question 2). The total number of responses (N=70) is due to multiple responses recorded for this question.

Table 3

Frequency and Percentages of Responses to "Program Planning and Implementation Survey"[a] Pertaining to Teachers' Estimates of Time Spent in Performance/Progress Evaluation Activities

1. Of the total amount of instructional and preparatory time devoted to this student, what percentage would you estimate you spend in performance/progress evolution activities?[b]

	N	Percent
1. up to 10%	2	4.65
2. 11-20%	16	37.20
3. 21-30%	11	25.58
4. 31-45%	6	13.95
5. 46-50%	5	11.62
6. 61-75%	2	4.65
7. 75% and up	1	2.32
Total	43	100.00

2. Under ideal conditions, would you like to see this percentage of time:

	N	Percent
increased	13	30.23
stay the same	25	58.13
decreased	5	6.97
Total	43	100.00

[a]Found in Section G, "Evaluation of Progress" section. For complete results, see Mirkin and Potter, 1982.

[b]Analysis is based on 43 respondents of the total sample of 128.

Appendix A

Materials and Postcard

Current teaching position: How many students do you teach ____ teach daily? _____ What is the age range of the students you teach? _____ Check one: Resource Room _____ Self Contained Classroom _____ Other _____

1. Have you heard of direct and frequent (precision-teaching type) measurement of student behavior? Yes _____ No ___

2. Do you use direct and frequent measurement in your classroom? Yes ___ No __ If yes, answer question 3. If no, answer question 4.

3. When you are teaching a student and using direct and frequent measurement what percentage of that time is devoted to measurement? ___ up to 10% __ 11-20% _ 21-30% __31-45% __46-60% __61-75% ___ more than 75%

4. What factors have inhibited your use of direct and frequent measurement? (Check one or more) __too time consuming, __not useful, _don't know how, _ Other (please specify) _____

APPENDIX B

Teacher responses to the following question: What factors have inhibited your use of direct and frequent measurement? Response category: Other

1. Frustration level of students, ours are B.D. and E.D. and Severely.
2. No materials.
3. Lack of materials.
4. Built in mastery tests in my reading and math programs.
5. When I did, all our time was spent on increasing speed and accuracy and too little progress was made.
6. Use aspects of it, not skilled enough.
7. Fragmented nature of program design. Instructional type of service delivery model.
8. Difficult to coordinate without aids to monitor results. Difficult procedure when teacher has total responsibility.
9. With 13 students, no aide time.
10. Timing often raises nxiety level and decreases performance.
11. I use criterion referenced procedures.
12. After 15 years experience in diagnostic/prescriptive teaching I can get the same information by careful observation.
13. No instrument available.
14. Use only in difficult situations - not necessary this year.

PUBLICATIONS

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